

SECTION IX

SOFTWARE

So1 TERMINAL COMPUTER™

Processor
Technology

9.1 CONSOL

CONSOL is a 1024 byte program designed to allow the Sol TERMINAL/COMPUTER to operate as a standard CRT terminal and to provide access to the essential computer capabilities of the Sol. Using CONSOL, self test and small diagnostic programs can be entered to system memory and executed. This in addition to providing verification of correct system operation helps in finding errors in case of a malfunction.

In addition, CONSOL contains standardized entry points for all normal I/O operations. These routines are common with all Sol System Software allowing each personality module in the Sol line to interface with external programs in an almost identical manner.

A cassette read routine is also resident in the CONSOL module allowing Sol Software to be loaded and run in a system with additional memory. Sol System Software as of November 1976 includes BASIC, FOCAL, a Scientific Calculator and numerous "game" packages including a 8K assembly language version of STARTREK called TREK80.

When power is applied to the Sol unit, CONSOL initializes the system RAM area, clears the screen, and enters the terminal mode.

In this mode the Sol System acts as a standard CRT terminal sending keyboard data to an output port and displaying received data on the screen. The COMMAND KEYS of the keyboard are not transmitted to the output port but are interpreted as direct internal operation keys. CURSOR MOVEMENT, HOME and CLEAR SCREEN all operate in this manner, while MODE SELECT causes an immediate change in the operation of the unit.

When the MODE key is depressed CONSOL issues a prompt character (>) and waits for a command line to be input. The Sol is now operating as a computer and is ready to accept one of the following commands:

DUmp	Dump memory locations to screen
ENter	Enter data to memory
EXecute	Execute a program in external memory
BAsic	Execute a program located at address zero
TErминаl	Return to terminal mode
TLoad	Load program or data from cassette tape
MODE	Press MODE SELECT key to start new command line

9.1.1 DUmP (addr) (addr)

The DUmP command displays memory data on the screen in a Hexidecimal representation. As with all Sol commands the command is recognized by the first two characters and up to ten additional characters can be input without an error being forced.

Thus, DU; DUST; DUMP; DUMPTHESE would all be recognized as being a DUmP command.

At least one address must follow the command or a error displayed on the screen. If two addresses are input then all values from the first address to the last will be displayed.

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DUMP 0      EF
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Up to ten blanks may be inserted between each parameter without forcing an error condition. Errors are indicated by a question mark (?) replacing the character where the error occurred. For example if the DU command were given without an address the question mark would appear ten spaces to the right of the "U".

9.1.2 ENter addr

The ENter command places sequential bytes into memory beginning at the specified address. Data, represented as hexadecimal values, are input from the keyboard for entry to memory. All CONSOL commands except MODE SELECT are executed when the RETURN key is pressed. After the ENTER, (address), RETURN sequence the Sol Displays a colon (:) prompt character. Values are then input one line at a time with each line terminated by a carriage return or linefeed. The ENter function itself is terminated with a slash (/) and the Sol goes back to the command mode when the slash is encountered.

With all command functions of CONSOL, input lines are terminated with a carriage return or line feed. If the terminator is a C/R, CONSOL will erase all characters from the current cursor location to the end of the screen line. In this case, all valid input should be to the left of the cursor. If an error occurred during input the cursor may be moved to the left using the "cursor-left" key and the erroneous characters changed. A linefeed would then be used as a terminator since LF does not erase the line prior to processing the characters. This is particularly useful when using the ENter command since the input line can be visually scanned and errors corrected prior to the actual entry of input data to memory.

9.1.3 TLoad (speed)

Included within COINSOL are routines to read standardized cassette tape Software which is recorded with a sixteen byte header that includes NAME, LOAD INFORMATION, FILE TYPE and execute address. CONSOL, because of space limitations, is unable to search for a

program or file by name. After receiving the TLoad command, CONSOL turns on the cassette player and waits for the next header, then uses the header information and loads the file to memory. The cassette recorder must be in play mode and properly connected before executing the TLoad command.

After loading the data, CONSOL returns to the command mode where the EXEC command can be used to execute the just loaded program. Also, a return can normally be made to the command mode by pressing the MODE SELECT key. Space limitations again limited escape during the header search, so if the system locks up in this routine the standard Sol restart must be used. To restart the Sol press UPPER CASE and REPEAT keys simultaneously.

The CUTS cassette interface electronics within the Sol will record or receive data at either of two standard speeds. TLoad will accept a parameter to select this speed, 0 being high speed and 1 being low. (1200 and 300 bits per second respectively). If no parameter is given CONSOL will default to high speed operation as all standard Processor Technology Sol-System Software is recorded at this speed.

9.1.4 EXecute addr

The execute command is used to run programs located in external memory. CONSOL branches to the external routine in a manner similar to an 8080 CALL instruction so the program can return to the command mode using a standard 8080 RET instruction if normal stack operations are used.

9.1.5 BASic

The BASic command is provided for executing programs whose starting address is 0, such as Sol-BASIC5.

9.2 STANDARD I/O ROUTINES

All Sol System personality modules contain similar I/O code for input/output operations. CONSOL, using 1K of memory, has routines for KEYBOARD and SERIAL PORT input as well as Serial Communications Channel and VIDEO DISPLAY OUTPUT. Although the same code for SOLOS and SOLED contains expanded functions, the I/O operations appear almost identical when used with external software.

Sol-BASIC5, for example, performs all I/O using the jump table of the personality modules. Thus, without altering BASIC the user may output to either the serial port or to the display screen. Provision is also made within BASIC to programatically change to any of the four available Input or Output options. CONSOL is of course limited to the two provided.